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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,695	05/19/2005	Yoshinori Onishi	043877-0141	9241

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EXAMINER
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KIM, JOHN K

ART UNIT	PAPER NUMBER
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2834

MAIL DATE	DELIVERY MODE
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06/17/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/535,695	<b>Applicant(s)</b> ONISHI, YOSHINORI	
	<b>Examiner</b> JOHN K. KIM	<b>Art Unit</b> 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 13-17 and 30-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 and 22 is/are rejected.
- 7) ☒ Claim(s) 19-21, 23 and 27-29 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 May 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/19/2005, 3/22/2006</u> .                                    | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Election was made without traverse in the reply filed on 4/28/2008. Claims 13-17 and 30-35 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected claims, there being no allowable generic or linking claim.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims.

The claim 18 recites "... a current introduction terminal affixed to said cover body block in an air-tight manner using an O-ring, said current introduction terminal including U-, V-, W- and E- phase; .." and Fig. 2 shows reference number 13 as terminal block. However, Fig. 2 does not show the terminal block 13 being connected to current introducing wires.

These items must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure

is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

3. Claim 18 is objected to because of the following informalities:

Claim 18 recites "... ; a current introduction terminal affixed to said cover body block in an air-tight manner using an O-ring, said current introduction terminal including U-, V-, W- and E-phase terminals; ...." However, the specification [0012] states three-phase, Fig. 2 shows three phase motor winding and no phase conversion system is shown or described. Therefore, the examiner interprets the system is three phase and E-phase is typographical error and not indicating a phase component but a ground (earth), i.e., U, V, W-phases and E (ground/earth) terminal. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim 18 recites "... a current introduction terminal affixed to said cover body block in an air-tight manner using an O-ring, said current introduction terminal including U-, V-, W- and E- phase; .." and Fig. 2 shows reference number 13 as terminal block. However, Fig. 2 does not show the terminal block 13 being connected to current introducing wires. The claim further recites "... said plurality of lead lines passing through said terminal block to an exterior side of said cover body obverse to the recess ..." and it is not clearly defined whether wires are connected and passing through the terminal block or wires are not connected and passing through the terminal block. According to Fig. 2, later is the case, but according to general sense, the first is the case. The examiner interprets the later is the case.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Shikayama et al (US 2003/0020340).

As for claim 1, Shikayama teaches (in Fig. 1) a coreless AC linear motor, comprising: a magnet assembly (20) forming a magnetic gap (between magnets 23); a can (14), said can further comprising a coil housing section (inside 14) forming a deep groove; a plurality of coreless coils (13) inserted into the deep groove and arranged in a straight line inside the magnetic gap; and a cover body (11) for sealing the can (14).

As for claim 2, Shikayama teaches the claimed invention as applied to claim 1 above. Shikayama further teaches (in [0008, 0009, 0014]) the material is stainless steel.

As for claim 3, Shikayama teaches the claimed invention as applied to claim 1 above. Shikayama further teaches (in Fig. 8) the magnet assembly (90) includes parallel rows of field magnets (93).

As for claim 4, Shikayama teaches the claimed invention as applied to claim 1 above. Shikayama further teaches (in Fig. 8) the magnet assembly (90) includes a pair of parallel side yokes (92) to which the rows of field magnets (93) are attached.

As for claim 5, Shikayama teaches the claimed invention as applied to claim 1 above. Shikayama further teaches (in Fig. 6) each coreless coil (83) is overlapped on another coreless coil (83).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shikayama et al (US 2003/0020340) in view of Tajima (US 6657327).

As for claim 6, Shikayama teaches the claimed invention as applied to claim 1 above. Shikayama further teaches (in Figs. 1 and 2) cooling slits (17 or 5, 151, 152) passing through the coreless coils (13) but fails to teach cooling pipes. In the same field of endeavor, Tajima teaches (in Fig. 6) cooling pipes (7). Therefore, it would have been

obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Tajima with that of Shikayama for simpler water-proof structure as leak prevention sheet and adhesive resin may not be needed when using pipes.

As for claim 7, Shikayama and Tajima teach the claimed invention as applied to claim 1 above. Shikayama, as modified by Tajima, further teaches (in Figs. 1 and 2) the cooling pipes (17) come into contact with inner surfaces of each coreless coil (13).

As for claim 8, Shikayama teaches the claimed invention as applied to claim 1 above. Shikayama further teaches (in Figs. 1 and 2) a plurality of spaced cooling slits (17 or 5, 151, 152) extending through the coreless coils (13) parallel to each other but fails to teach cooling pipes. In the same field of endeavor, Tajima teaches (in Fig. 6) cooling pipes (7). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Tajima with that of Shikayama for simpler water-proof structure as leak prevention sheet and adhesive resin may not be needed when using pipes.

As for claim 9, Shikayama and Tajima teach the claimed invention as applied to claim 8 above. Shikayama, as modified by Tajima, further teaches (in Figs. 1 and 2) the plurality of cooling pipes (17) come into contact with inner surfaces of each of the plurality of coreless coils (13).

11. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shikayama et al (US 2003/0020340) in view of Koyanagawa et al (US 2003/0155818).



As for claim 10, Shikayama teaches the claimed invention as applied to claim 1 above. Shikayama however failed to teach the can includes a flange section which is wider than the coil housing section and joined to the cover body. In the same field of endeavor, Koyanagawa teaches (in Fig. 1) a can (50) includes a flange section (at numeric 58) which is wider than the coil housing section (at numeric 46A) and joined to the cover body (48, 60). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Koyanagawa with that of Shikayama for simpler structure by making integration of mover components.

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shikayama et al (US 2003/0020340) in view of Koyanagawa et al (US 2003/0155818) and in further view of Ota et al (US 2004/0080217).

As for claim 11, Shikayama and Koyanagawa teach the claimed invention as applied to claim 10 above. The references, however, failed to teach an O-ring for sealing between the can and the cover body in an air-tight manner, wherein the flange section further comprises a seat for receiving the O-ring. In the same field of endeavor, Ota teaches (in Fig. 4) an O-ring (111) for sealing between the can (102) and the cover body (101) in an air-tight manner, wherein the flange section (101) further comprises a seat (recess for 111) for receiving the O-ring (111). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to

combine the teaching of Ota with those of Shikayama and Koyanagawa for air sealing in vacuum environment. [0001]

13. Claim 12 is alternatively rejected under 35 U.S.C. 103(a) as being unpatentable over Shikayama et al (US 2003/0020340) in view of Tamai et al (US 2004/0032170).

As for claim 12, Shikayama teaches the claimed invention as applied to claim 1 above. Shikayama however failed to teach a plurality of coreless coils are fixed to the can using resin or adhesive. In the same field of endeavor, Tamai teaches (in Fig. 2) a plurality of coreless coils (6) are fixed using resin or adhesive (9).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Tamai with that of Shikayama for electrical insulation and fixation of coils.

14. Claims 18-20, 22-23 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shikayama et al (US 2003/0020340) in view of Koyanagawa et al (US 2003/0155818) and in further view of Chitayat (US 5723917), Tamai et al (US 2004/0032170), Tajima (US 6657327), Ota et al (US 2004/0080217) and Paul et al (US 2004/0016297).

As for claim 18, Shikayama teaches a coreless AC linear motor (1), comprising: a can assembly, said can assembly further comprising: a can (14); a U-shaped coil housing section (inside 14) forming a deep groove within; and a flange section (11)

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forming a flange recess at (12); a coil assembly (13) disposed in said can (14), said coil assembly further comprising a plurality of flat three-phase [0008] coreless coils (13), said plurality of coils overlapping each other (Fig. 6); a first manifold (14 on 32 side), said first manifold comprising: a vertical manifold cooling medium inlet passage (32); and a first brim section (portion between 32 and 14 in Fig. 2), said first brim section connecting said first manifold to the flange recess (recess for 12 in Fig. 1, which is represented as dot line in Fig. 2); a second manifold (14 on 31 side) obverse to said first manifold (14 on 32 side), said second manifold further comprising: a vertical manifold cooling medium outlet passage (31); and a second brim section (portion between 31 and 14 in Fig. 2), said second brim section connecting said second manifold to the flange recess (recess for 12 in Fig. 1, which is represented as dot line in Fig. 2); and a plurality of cooling slits [pipes] (15, 151, 152) in physical communication with and passing through [0052-0053] each of said plurality of coreless coils, said plurality of cooling slits [pipes] (15, 151, 152) connected to said first and second manifolds (14) (Figs. 2 and 4), said plurality of cooling pipes distributing a cooling medium [0052] from the manifold cooling medium inlet passage (32) to the manifold cooling medium outlet passage (31); a hardened epoxy resin (18, 19) encapsulating said first and second manifolds (14), and said plurality of cooling pipes (15) (Fig. 3); a cover body (11) affixed to said flange section, said cover body (11) forming a recess on an interior portion of the can assembly (see Fig. 1), a terminal introduction hole (33), a cover body cooling medium inlet passage (portion of 32 at 11) in physical communication with manifold cooling medium inlet passage (portion of 32 at 14), and a cover body cooling medium

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outlet passage (portion of 31 at 11) in physical communication with said manifold cooling medium outlet passage (portion of 31 at 14), an inlet joint (32) in physical communication with the cover body cooling medium inlet passage; an outlet joint (31) in physical communication with the cover body cooling medium outlet passage;

Shikayama further teaches (in Fig. 6) a plurality of lead lines (33) in physical communication with said plurality of coils (83), said plurality of lead lines (33) passing through said terminal block to an exterior side of said cover body (81) obverse to the recess (at cover body 81 wire inlet); a current introduction terminal (33) affixed to cover body block (11) except in an air-tight manner using an O-ring, said current introduction terminal (33) including U-, V-, W- phase (three wires in Fig. 6) and [0045] [except E-terminals]; a magnet assembly (20), said magnet assembly further comprising: first and second side yokes (22), said first and second side yokes (20) arranged parallel with each other; a center yoke (21) connecting said first and second side yokes (22); and a plurality of permanent magnets (23) affixed to facing portions of said first and second side yokes (22) and forming a magnetic gap therebetween, adjacent ones of said plurality of permanent magnets (23) having alternating magnetic poles (Fig. 8).

Shikayama, however, failed to teach a cover body affixed to said flange section using a plurality of bolts. However, it is notoriously old and well known in the art to have bolts to secure cover, and therefore the examiner hereby takes official notice regarding cover body affixed by using a plurality of bolts. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made for easy secure with bolts. Shikayama however teaches cooling slits instead of cooling pipes. In the

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same field of endeavor, Tajima teaches (in Fig. 6) cooling pipes (7). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Tajima with that of Shikayama for simpler water-proof structure as leak prevention sheet and adhesive resin may not be needed when using pipes. Shikayama further failed to teach E terminal for a current introduction terminal (33), but Chitayat, in the same field of endeavor, teaches (in Fig. 3) a ground terminal (64) for three phase (54, 56 and 58) linear motor armature (45). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Chitayat with those of Shikayama for safety in case of fault phase by providing ground or for wye three phase system. Shikayama further failed to teach a hardened epoxy resin encapsulating plurality of coreless coils, but Tamai, in the same field of endeavor, teaches (in Fig. 2) a plurality of coreless coils (6) are fixed using resin or adhesive (9). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Tamai with that of Shikayama for electrical insulation and fixation of coils. Shikayama further failed to teach, a flange section forming a flange O-ring seat; a plurality of cooling pipes; a cover body O-ring seat, a resin injection hole, said cover body further comprising a terminal block housed in the recess; an O-ring in physical communication with and between the flange O-ring seat and the cover body O-ring seat, said O-ring sealing said can to said cover body in an air-tight manner; a cover body block affixed to said cover body in an air-tight manner using an O-ring, said cover body block forming an introduction passage adjacent to said terminal introduction hole; a current

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introduction terminal affixed to said cover body block in an air-tight manner using an O-ring; and a vacuum flange in physical communication with and between said cover body block and said current introduction terminal. Shikayama discloses (in Fig. 1) the mover assembly (10) comprising base (11) and can assembly (mover 10) having a T-shaped cross-section but failed to teach the can (14) having a T-shaped cross-section. In the same field of endeavor, Koyanagawa teaches (in Figs. 1 and 7-8) a can (50) having a T-shaped cross-section, a cover body (264) affixed to flange section (where numeric 268 is pointing) using a plurality of bolts (convex elements at 268), said cover body forming a recess on an interior portion of the can assembly, a cover body cooling medium inlet passage (272) in physical communication with manifold cooling medium inlet passage, and a cover body cooling medium outlet passage (255) in physical communication with said manifold cooling medium outlet passage. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Koyanagawa with that of Shikayama for simpler structure by making integration of mover components. Koyanagawa however failed to teach a cover body having a cover body O-ring seat, a resin injection hole, said cover body further comprising a terminal block housed in the recess; an O-ring in physical communication with and between the flange O-ring seat and the cover body O-ring seat, said O-ring sealing said can to said cover body in an air-tight manner; a cover body block affixed to said cover body in an air-tight manner using an O-ring, said cover body block forming an introduction passage adjacent to said terminal introduction hole; a current introduction terminal affixed to said cover body block in an air-tight manner using an O-

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ring; and a vacuum flange in physical communication with and between said cover body block and said current introduction terminal; said cover body further comprising a terminal block housed in the recess; In the same field of endeavor, Ota teaches (in Fig. 4) a flange O-ring seat (recess for 111), an O-ring (111) in physical communication with and between the flange O-ring seat (recess for 111) [except the cover body O-ring seat], said O-ring (111) sealing can (102) to cover body (101) in an air-tight manner (for vacuum use) [0001]; and further teaches (in Fig. 2) a vacuum flange (portion enclosing the electrical leads) in physical communication with and between cover body block (left side portion attached to parts 1-5) and current introduction terminal (electrical leads shown on said vacuum flange for connection to coil wires); said cover body (left side portion attached to parts 1-5) further comprising a terminal block (electrical leads shown on said vacuum flange for connection to coil wires) housed in the recess (as shown for wires passage). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Ota with those of Shikayama, Koyanagawa, Chitayat and Tamai for air tight sealing by using O-ring. Regards Ota's failure to teach a cover body O-ring seat, however, Paul, in the same field of endeavor, teaches (in Fig. 2) a cover body (21) O-ring seat (29). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Paul with those of Shikayama, Koyanagawa, Chitayat, Tamai and Ota to provide an O-ring space for air tight sealing.

As for claim 22, Shikayama, Koyanagawa, Chitayat and Ota teach the claimed invention as applied to claim 18 above. Shikayama further teaches (in Fig. 6) said plurality of flat three-phase coreless coils (83) are arranged in U-phase, V-phase, and W-phase, in a movement direction.

As for claims 19-20, 23 and 27-29, The references discloses the claimed invention except for exactly the same dimensions. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have those values, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

15. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shikayama et al (US 2003/0020340) in view of Koyanagawa et al (US 2003/0155818) and in further view of Chitayat (US 5723917), Tamai et al (US 2004/0032170), Ota et al (US 2004/0080217) and Paul et al (US 2004/0016297) as modified in claim 18 above, and in further view of Yamamoto et al (US 6657326).

As for claims 24 and 25, Shikayama, Koyanagawa, Chitayat and Ota teach the claimed invention as applied to claim 18 above. The references, however, failed to teach the said first and second manifolds are comprised of austenitic stainless steel. In



the same field of endeavor, Yamamoto teaches (in Fig. 2) first and second manifolds (89) are comprised of austenitic stainless steel (SUS 304). (col. 13, line 19-21)

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Yamamoto with those of Shikayama, Koyanagawa, Chitayat and Ota so that iron loss can be reduced and motor efficiency can be improved.

As for claim 26, Shikayama, Koyanagawa, Chitayat, Ota and Yamamoto teach the claimed invention as applied to claim 24 above. The references, however, failed to teach the austenitic stainless steel is defined by Japanese Industrial Standards SUS200. However, it is notoriously old and well known in the art to have SUS 200 series (201 or 202) for austenitic stainless steel as SUS 200 series is well known austenitic stainless steel (see attached web site page from Wikipedia.com), and therefore the examiner hereby takes official notice regarding SUS 200. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use SUS 200 series steel as an austenitic stainless steel for lower cost.

16. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shikayama et al (US 2003/0020340) in view of Tajima (US 6657327).

The references disclose the claimed invention except for number of cooling pipes are seven. It would have been obvious to one having ordinary skill in the art at the time

the invention was made to have seven pipes as it is medium number of two teachings, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN K. KIM whose telephone number is (571)270-5072. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-270-6072.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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JK

/Darren Schuberg/  
Supervisory Patent Examiner, Art Unit 2834